Appendix I – Impact Assessment

PROJECT IMPACT ASSESSMENT, SIGNIFICANCE AND MITIGATION MEASURES SUMMARY

The following impact rating approach used by Enviro Africa CC is a basic exponential rating system to assess actual and potential negative environmental impacts.

Positive environmental impacts are also listed. All positive impacts need to be enhanced or increased where possible but positive impacts are not rated or given a score since the rating is based on risks.

Environmental activities or aspects are identified, based on:

- the phase of the project,
- the nature (or description) of the actual and potential impacts of the activities.

For every project activity or aspect, various environmental impacts are listed. Every negative impact is allocated a value as per each of the following criteria:

- Likelihood (Probability)
- Extent (Severity)
- Duration (Frequency)
- Consequence (Receiving environment and Toxicity)

Once a value is allocated for each of the criterion, the scores are averaged to determine the final impact rating see Table 1 below.

Enviro Africa then further assesses environmental significance, based on the nature of the impact, as per the score and colour key which forms part of Table 1 below. This results in impacts having either a low (indicated in green), medium (indicated in yellow) or high (indicated in orange and red) significance.

Note: i. One environmental aspect or project activity e.g. site clearance may have multiple impacts in different areas.

ii. The various impacts per aspect/project activity are documented in the Quantification of Aspects and Impact/s Significance Rating form (Table 2 Annexure B).

iii. As a baseline, impact rating values/scores are allocated taking the **worst case** scenario into account i.e. with no mitigation. The baseline rating is compared with those after mitigation has been taken into account i.e. the post-mitigation rating. Post mitigation rating is used for the actual impact assessment.

SIGNIFICANCE CRITIERIA	Very High	Moderately High	Medium	Moderately Medium	Low	Very Low	Score
Value	**32**	**16**	**8**	**4**	**2**	**1**	
Likelihood / Probability (L/P)	Impact will definitely occur	Very likely for impact to occur	Impact may occur once annually	Impact may occur less than once annually but at least twice every five years	Impact may occur one to two times (maximum) in project's life	Very unlikely for impact to occur / Impact will not occur	
Extent / Severity (E/S)	Impact potentially reaches beyond national boundaries	Impact has definite provincial potential national consequences	Impact will a potentially affect neighbouring province	Impact confined to local province	Impact confined to local region but not province wide	Impact confined to project property / site	
Duration / Frequency (D/F)	Continual / daily occurrence	Impact will occur once a week	Impact will occur once a month	Impact will occur once a year	Impact will occur once every ten years	Possible that impact will never occur in Project's	
Consequence: Receiving environment (C: RE)	Very sensitive, pristine area – protected site or species permanently or seasonally present	Unused industrially zoned area containing only indigenous fauna / flora species	Unused industrially zoned area containing indigenous and alien fauna / flora species	Semi-disturbed area already rehabilitated / recovered from prior impact	Disturbed area undergoing rehabilitation / recovering from prior impacts	Disturbed area, already in need of rehabilitation prior to impact	
Consequence: Toxicity (C:T)	Impact is poisonous to natural environment and is not contained - no rehabilitation possible - permanent irreversible impact	Impact is potentially poisonous to natural environment and is not contained – only partial rehabilitation possible – potential permanent irreversible impact	Impact is potentially poisonous to natural environment and is partially contained – some rehabilitation possible and is potentially reversible	Impact is potentially poisonous to natural environment and is partially contained – complete rehabilitation possible	Impact is potentially poisonous to natural environment but is completely contained	Impact is not poisonous to natural environment	
FINAL RATING (average score)							

ENVIRONMENTAL RATING SIGNIFICANCE KEY:

SIGNIFICANCE	RATING	Final rating score / value range
Significant	Very High	25 to 32
	High	19 to <25
Increasing Significance	Medium	13 to <19
	Moderately Medium	6 to <13
Insignificant	Low	3 to <6
	Very Low	1 to <3

Table 1: **Environmental Significance rating methodology (rating criteria and scoring to allocate significance)**

A. ASPECT / ACTIVITY: Transport of Equipment / Material to Site (pre-construction site establishment)

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact	Short Description of Mitigation Measures
1	Particulate and gaseous emissions due to use of vehicles/machinery	32	32	32	1	32	25,8	32	16	32	1	32	22,6	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks. Dust suppression e.g. using chemical road sealers. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads.
2	Potential impedance of normal traffic flow on main access road	16	8	4	4	2	6,8	16	8	4	2	2	6,4	Traffic management plan in place. Comply with legislative requirements. If necessary, use traffic controllers.
3	Animal/human interaction/accident with vehicles	32	2	1	8	2	9	8	2	1	8	2	4,2	Training and awareness regarding road safety. Routine checks to ensure vehicles in good condition.
4	Vehicle accident	16	8	4	1	2	6,2	8	8	4	1	2	4,6	Training and awareness regarding road safety. Routine checks to ensure vehicles in good condition.
5	Spillages of fuel/oil/HCSs from vehicles/vehicle loads	32	2	4	32	4	14,8	16	2	4	32	4	11,6	Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. Routine monitoring of vehicle loads and vehicles for leaks.
6	Noise from heavy vehicles	32	2	16	1	1	10,4	16	1	16	1	1	7	Ensure vehicle exhaust pipes in good condition. Vehicles not to be used ouside of normal working hours.
7	Potential littering along route from drivers/personnel in vehicles	32	16	16	8	1	14,6	16	2	16	2	1	7,4	Training and awareness regarding littering. Provision of rubbish bags for inside vehicle when travelling.
8	Impact of slowed traffic due to possible abnormal loads being transported on public roads	16	16	8	1	1	8,4	8	16	4	1	1	6	Limit transport of abnormal loads to site if possible. Avoid built up areas during peak traffic times.
9	Aesthetic/visual impact of stored/parked vehicles and equipment	32	1	32	1	1	13,4	16	1	16	1	1	7	Park vehicles and store equipment at designated areas on site using natural topography/vegetation/buildings as screens.
10	Environmental training/awareness e.g. at on-site start up													

B. ASPECT / ACTIVITY: Site Clearance ("grub and clear")

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact	Short Description of Mitigation Measures
1	Negative impact on protected trees/plants/fauna during site clearance	32	1	32	32	32	25,8	16	1	4	8	16	9	Demarcation of protected trees to be avoided, or for which permits must be applied for correct removal and/or relocation (c.f. biodiversity specialist report). Designation of no-go areas on site to protect flora/trees to be defined at on-site start up meeting. Environmental awareness/training. Routine site compliance checks.
2	Gaseous emissions due to use of vehicles/machinery	32	32	32	1	32	25,8	32	16	32	1	32	22,6	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks.
3	Dust (particulate) emission generation	32	8	32	1	32	21	16	4	32	1	16	13,8	Utilisation of dust suppression on roads e.g. using chemical road sealers. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads. Vehicles confined to roads only. Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks.
4	Indigenous biodiversity (flora) removal	32	2	16	32	8	18	32	1	4	8	1	9,2	Demarcation of protected plants and trees to be avoided, or for which permits must be applied for correct removal and/or relocation (c.f. biodiversity specialist report). Designation of no-go areas on site to protect flora/trees to be defined at on-site start up meeting. Environmental awareness/training. Routine site compliance checks.
5	Alien biodiversity (flora) removal													
6	Topsoil removal/stockpiling	32	2	16	8	1	11,8	32	1	16	8	1	11,6	Topsoil management plan to be in place at on-site start up meeting. Routine site checks to ensure compliance.
7	Habitat loss (effect on fauna)	32	1	4	8	1	9,2	32	1	4	8	1	9,2	Due to the nature of the development, habitat loss will take place irrespective of mitigation measures.
8	Animal interaction/fatalities	16	1	16	8	1	8,4	16	1	4	8	1	6	Designation of no-go areas on site to be defined at on-site start up meeting.Environmental awareness/training. Routine site compliance checks.
9	Heritage discovery (archaeological or palaeontological) due to excavation	8	1	4	8	1	4,4	2	1	2	8	1	2,8	Designation of no-go areas on site to be defined at on-site start up meeting.Environmental awareness/training. Routine site compliance checks as per EMPr.
10	Visual impact of site clearance/dust	32	2	32	1	1	13,6	16	2	32	1	1	10,4	Utilisation of dust suppression on roads e.g. using chemical road sealers. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads. Vehicles confined to roads only. Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks.
11	Local employment opportunities													
12	Environmental training/awareness e.g. at on-site start up meeting													

C. ASPECT / ACTIVITY: Site establishment

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact	Short Description of Mitigation Measures
1	Temporary roads for site establishment	32	2	8	8	1	10,2	32	1	4	8	1	9,2	Clear designation of temporary road area and requirements for vehicles to be confined to roads on site. Utilisation of dust suppression on roads e.g. using chemical road sealers. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads.
2	Gaseous emissions due to use of vehicles/machinery	32	32	32	1	32	25,8	32	16	32	1	32	22,6	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks.
3	Dust (particulate) emission generation	32	8	32	1	32	21	16	4	32	1	16	13,8	Utilisation of dust suppression on roads e.g. using chemical road sealers. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads. Vehicles confined to roads only. Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks.
4	Poor access control/fencing	32	1	32	8	1	14,8	2	11	4	8	1	5,2	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
5	Demarcation of lay down area	32	2	8	1	1	8,8	32	1	4	1	1	7,8	Lay down area clearly defined before any material/equipment arrives on site. Lay down area to be within area applied for as part of BAR. Routine site inspection for adhereance to lay down area parameters.
6	Ablutions for site labour (non-adherance to designated areas)	32	2	32	1	8	15	32	1	16	1	1	10,2	Training and awareness regarding designated ablution areas and need for adherance. Provision of sufficient ablutions area in line with legal requirements on site. Ad hoc site visits to check compliance in line with training.
7	Littering	32	16	16	8	1	14,6	16	2	16	2	1	7,4	Training and awareness regarding littering. Provision of sufficient rubbish bins on site. Ad hoc checks to ensure compliance in line with training.
8	Habitat loss (effect on fauna)	32	1	4	8	1	9,2	32	1	4	8	1	9,2	Due to the nature of the development, habitat loss will take place irrespective of mitigation measures.

9	Animal interaction/fatalities	16	1	16	8	1	8,4	16	1	4	8	1	6	Designation of no-go areas on site to be defined at on-site start up meeting.Environmental awareness/training. Routine site compliance checks.
10	Visual impact of site clearance/dust	32	2	32	1	1	13,6	16	2	32	1	1	10,4	Utilisation of dust suppression on roads e.g. using chemical road sealers. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads. Vehicles confined to roads only. Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks.
11	Resource use: water	32	1	32	2	1	13,6	32	1	32	2	1	13,6	Training and awareness regarding sound water use/management. Storm water management plan in place at on-site start up meeting. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
12	Resource use: land	32	2	32	8	1	15	32	1	32	2	1	13,6	Training and awareness regarding land management on site. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
13	Resource use: hydrocarbons/fuels	32	2	32	8	16	18	32	2	32	8	2	15,2	Training and awareness regarding efficient fuel/hydrocarbon use. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
14	Recycling of waste products where possible													
15	Demarcation and preservation of heritage/culturally sensitive aspects of site for inclusion in development													
16	Storage of fuels/hazardous chemical substances	32	2	4	32	4	14,8	16	2	4	32	4	11,6	Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. HCSs and fuel stores stored in line with legal requirements. Routine monitoring of vehicle loads and vehicles for leaks.

D. ASPECT / ACTIVITY: Construction

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact	Short Description of Mitigation Measures
1	Poor access control/fencing	32	1	32	8	1	14,8	2	11	4	8	1	5,2	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
2	Demarcation of lay down area	32	2	8	1	1	8,8	32	1	4	1	1	7,8	Lay down area clearly defined before any material/equipment arrives on site. Lay down area to be within area applied for as part of BAR. Routine site inspection for adhereance to lay down area parameters.
3	Ablutions for site labour (non-adherance to designated areas)	32	2	32	1	8	15	32	1	16	1	1	10,2	Training and awareness regarding designated ablution areas and need for adherance. Provision of sufficient ablutions area in line with legal requirements on site. Ad hoc site visits to check compliance in line with training.
4	Littering	32	16	16	8	1	14,6	16	2	16	2	1	7,4	Training and awareness regarding littering. Provision of sufficient rubbish bins on site. Ad hoc checks to ensure compliance in line with training.
5	Habitat loss (effect on fauna)	32	1	4	8	1	9,2	32	1	4	8	1	9,2	Due to the nature of the development, a small degree of habitat loss will take place irrespective of mitigation measures.
6	Animal interaction/fatalities	16	1	16	8	1	8,4	16	1	4	8	1	6	Designation of no-go areas on site to be defined at on-site start up meeting.Environmental awareness/training. Routine site compliance checks.
7	Aesthetic impact during construction	32	2	2	1	1	7,6	16	2	2	1	1	4,4	Use natural topgraphy where possible to screen final layout of building material. Park vehicles and store equipment at designated areas on site using natural topography/vegetation/ buildings as screens. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads and using dust suppression on roads. Vehicles confined to roads only. Routine site and vehicle checks.

8	Resource use: water	32	1	32	2	1	13,6	32	1	32	2	1	13,6	Training and awareness regarding sound water use/management. Storm water management plan in place at on-site start up meeting. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
9	Resource rehabilitation, restoration and conservation: water													
10	Resource use: land	32	2	32	8	1	15	32	1	32	2	1	13,6	Training and awareness regarding land management on site. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
11	Resource rehabilitation, restoration and conservation: land (biodiversity)													
12	Resource use: hydrocarbons/fuels	32	2	32	8	16	18	32	2	32	8	2	15,2	Training and awareness regarding efficient fuel/hydrocarbon use. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
13	Recycling of waste products where possible													
14	Storage of fuels/hazardous chemical substances	32	2	4	32	4	14,8	16	2	4	32	4	11,6	Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. HCSs and fuel stores stored in line with legal requirements. Routine monitoring of vehicle loads and vehicles for leaks.
15	Noise from heavy vehicles	32	2	16	1	1	10,4	16	1	16	1	1	7	Ensure vehicle exhaust pipes in good condition. Vehicles not to be used ouside of normal working hours.
16	Training/Skills transfer													
17	Local employment opportunities													
18	Inclusion of heritage/culturally sensitive aspects as part of development													

E. ASPECT / ACTIVITY: Operation and Maintenance

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact	Short Description of Mitigation Measures
1	Poor access control/fencing	32	1	32	8	1	14,8	2	11	4	8	1	5,2	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
2	Disturbance of no-go areas established for rehabilitation/memorial park garden areas	32	2	8	1	1	8,8	32	1	4	1	1	7,8	No-go areas must be clearly defined and demarcated with information provided as to what is being achieved in terms of rehabilitation and conservation. Routine site inspection by maintenance or security personnel to ensure adhereance to demarcated areas.
3	Ablutions on site (non-adherance to designated areas)	32	2	32	1	8	15	32	1	16	1	1	10,2	Provision of sufficiently accessible ablution areas in line with legal requirements for site.
4	Littering	32	16	16	8	1	14,6	16	2	16	2	1	7,4	Training and awareness regarding littering. Provision of sufficient rubbish bins on site. Ad hoc checks to ensure compliance in line with training.
5	Habitat/biodiversity restoration and conservation													
6	Freshwater/watercourse rehabilitation, restoration and conservation													
7	Aesthetic impact during normal operation/grave preparation	32	2	2	1	1	7,6	16	2	2	1	1	4,4	Use natural topgraphy where possible to screen final layout of development. Landscaping on dominant visual impact side (e.g. facing public road) to avoid excessive visual impact. Park vehicles and store equipment at designated areas on site using natural topography/vegetation/ buildings as screens. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads and using dust suppression on roads. Vehicles confined to roads only. Routine site and vehicle checks.

8	Resource use: water	32	1	32	2	1	13,6	32	1	32	2	1	13,6	Training and awareness regarding sound water use/management. Storm water management plan in place at on-site start up meeting. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
9	Resource contamination: groundwater	16	2	32	8	16	14,8	8	2	32	4	16	12,4	Construction of graves relative to soil type to prevent excessive permeation of pollutants into soil. Prevention of water ingress and ponding in/around graves. Positioning of graves on site so that distance to groundwater body is maximised.
10	Resource use: land	32	2	32	8	1	15	32	1	32	2	1	13,6	Training and awareness regarding land management on site. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
11	Resource use: hydrocarbons/fuels	32	2	32	8	16	18	32	2	32	8	2	15,2	Training and awareness regarding efficient fuel/hydrocarbon use. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
12	Recycling of waste products where possible													
13	Storage of fuels/hazardous chemical substances	32	2	4	32	4	14,8	16	2	4	32	4	11,6	Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. HCSs and fuel stores stored in line with legal requirements. Routine monitoring of vehicle loads and vehicles for leaks.
14	Training/Skills transfer													
15	Local employment opportunities													
16	Inclusion of heritage/culturally sensitive aspects as part of development													
17	Use of renewable/clean energy for power supply													

F. ASPECT / ACTIVITY: Decommissioning/Demolition -

This aspect is not specifically applicable to the proposed cemetery and memorial park development since the development will have to be maintained even when capacity is reached. Any extension possibilities must not negate positive conservation, presevation and asthetic impacts achieved by the development.

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact assessment)	Short Description of Mitigation Measures
1	Poor access control/fencing	32	1	32	8	1	14,8	2	11	4	8	1	5,2	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
2	Disturbance of no-go areas established for rehabilitation/memorial park garden areas	32	2	8	1	1	8,8	32	1	4	1	1	7,8	No-go areas must be clearly defined and demarcated with information provided as to what is being achieved in terms of rehabilitation and conservation. Routine site inspection by maintenance or security personnel to ensure adhereance to demarcated areas.
3	Ablutions on site (non-adherance to designated areas)	32	2	32	1	8	15	32	1	16	1	1	10,2	Provision of sufficiently accessible ablution areas in line with legal requirements for site.
4	Littering	32	16	16	8	1	14,6	16	2	16	2	1	7,4	Training and awareness regarding littering. Provision of sufficient rubbish bins on site. Ad hoc checks to ensure compliance in line with training.
5	Effect on fauna (established habitat)													
6	Habitat/biodiversity restoration and conservation													
7	Freshwater/watercourse rehabilitation, restoration and conservation													
8	Aesthetic impact from established well maintained cemetery and memorial park													
9	Resource use: land	32	2	32	8	1	15	32	1	32	2	1	13,6	Training and awareness regarding land management on site. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
10	Resource use: hydrocarbons/fuels	32	2	32	8	16	18	32	2	32	8	2	15,2	Training and awareness regarding efficient fuel/hydrocarbon use. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
11	Recycling of waste products where possible													

12	Storage of fuels/hazardous chemical substances	32	2	4	32	4	14,8	16	2	4	32	4	11,6	Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. HCSs and fuel stores stored in line with legal requirements. Routine monitoring of vehicle loads and vehicles for leaks.
14	Training/Skills transfer													
15	Local employment opportunities													
16	Inclusion of heritage/culturally sensitive aspects as part of development													